

WINDS FOR CHANGE

ENERGY SCULPTURE



A PEACE ENERGY COOPERATIVE PROJECT
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Photo illustration by Jaycee Abel and Tracy Wandling, Peace photoGraphics

Simulated view of the completed "Winds for Change" renewable energy power system planned for the Dawson Creek Fire Hall: the Energy Sculpture and its three wind turbines, and a 4 kw photovoltaic array on the Fire Hall's roof.

WINDS FOR CHANGE

ENERGY SCULPTURE

DESCRIPTION

The Peace Energy “Winds for Change” Energy Sculpture will provide an attractive and functional demonstration of small-scale wind and solar power while providing emergency back-up power for the Fire Hall’s 911 fire dispatch call centre. Located in a visible, park-like public space next to the Fire Hall in front of City Hall, the sculpture and a roof-mounted solar PV system will charge a battery bank for emergency back-up at the Fire Hall, and will net metre excess power into the grid to reduce the Fire Hall’s on-going electrical bill. The city’s new plug-in hybrid will also be charged by this system, making it a true wind and solar powered hybrid electric vehicle.

PURPOSE

1) A POWER STATION: This combination wind and PV installation will reduce the Fire Hall’s electrical bill and carbon footprint on an on-going basis, generating a peak power of 8 kilowatts and an estimated average output of 2 kilowatts. The Fire Hall battery bank will be sized to provide emergency back up power for the Fire Hall’s 911 fire dispatch call centre for a period of 24 hours without additional input, but will in reality run much longer with input from the wind and solar generators. The charging station for the city’s plug-in hybrid vehicle will also be powered by this renewable energy system.

2) A RESEARCH STATION: Dawson Creek intends to install a variety of wind turbines and PV arrays in and around the city with the long term goal of becoming energy independent with renewables. This Energy Sculpture and PV array will gather real-world data and will test all aspects of a wind / PV grid-tie and battery charging power system.

3) A RENEWABLE ENERGY EDUCATIONAL FACILITY: As one of the first working grid-tied wind and PV energy systems in the province and the first in the city, it will provide a visible focal point for those interested in learning more about the practical applications of wind and solar power technology. A permanent information plaque attached to the sculpture will explain to the public how it works and will list the sponsors who made it possible. The PV array, installed on the roof of the Fire Hall facing the front lawn of City Hall’s main entrance, will be clearly visible to the public. A display in City Hall will show the public how much power is being generated in real time, accumulated power output, and carbon emissions avoided.

4) A SCULPTURE: The wind component of this installation will be a visible kinetic art piece of distinction that will be a symbol of hope for a clean energy future, as well as a prominent and unique attraction for visitors.

Commissioning date goal: September, 2009

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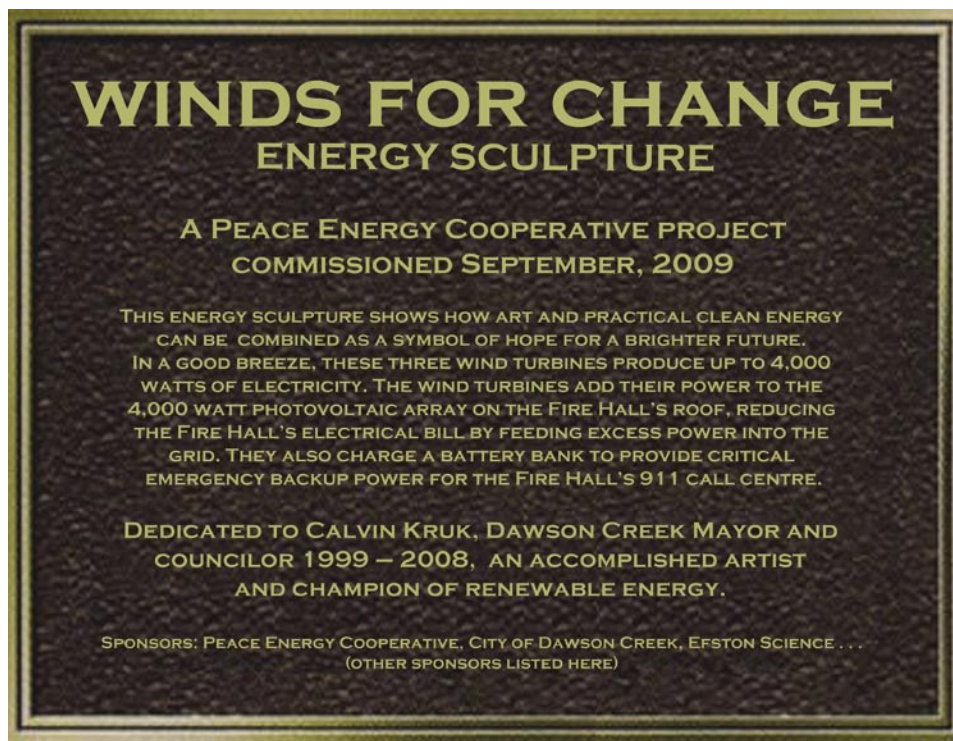
FUNDING

Peace Energy Cooperative (PEC), based in Dawson Creek, will be the lead organization for the project, seeking grants, cash and in-kind donations to render it essentially revenue neutral for both the city and the cooperative.

It is proposed that Peace Energy will design, fund raise, install and commission the entire system, (meeting all city engineering and electrical standards) then “gift” it to the city, who will then take over on-going maintenance and operation of the system. The city will benefit from reduced electrical bills for the life of the system.

All contributions and in-kind donations will be processed through a community foundation, and will be tax deductible. Sponsors and contributors will be listed on the permanent commemorative plaque on the Energy Sculpture (see below), will be featured on the PEC website, and will be included in press and media related to the project.

Estimated cost, installed: \$225,000



A 2' x 2' information plaque will be permanently installed on the Energy Sculpture

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TECHNICAL DESCRIPTION

When the wind blows the three wind generators at the top of the poles spin, generating AC electrical current that is carried by underground wire to the Fire Hall. Excess wind power not used by the Fire Hall will be fed into the grid, or used to charge an emergency power battery bank. A four kilowatt PV array on the roof of the Fire Hall will also feed into the grid or charge the batteries. Both the wind and solar power will accumulate as credit to be drawn from the grid when the wind isn't blowing or the sun isn't shining. This is called a "grid-tie" system.

VERTICAL AXIS WIND GENERATORS have been chosen for a variety of reasons: they are attractive and extremely quiet, bird and bat friendly, unobtrusive, they are low maintenance and have a long life. They easily utilize gusting wind from any direction, making them suitable for more obstructed urban locations.

The Greenpower Utility System (GUS) generator design was developed in Finland and is now manufactured in Toronto. The light-weight, rotating spiral vanes of the turbine are based on sail engineering principles. They catch even the slightest breeze, generating electricity in winds as low as 1.5 m/s (4 mph). They are self-regulating in high winds, and come with a five year guarantee.

This proposed installation uses two sizes of GUS turbine (see drawing):

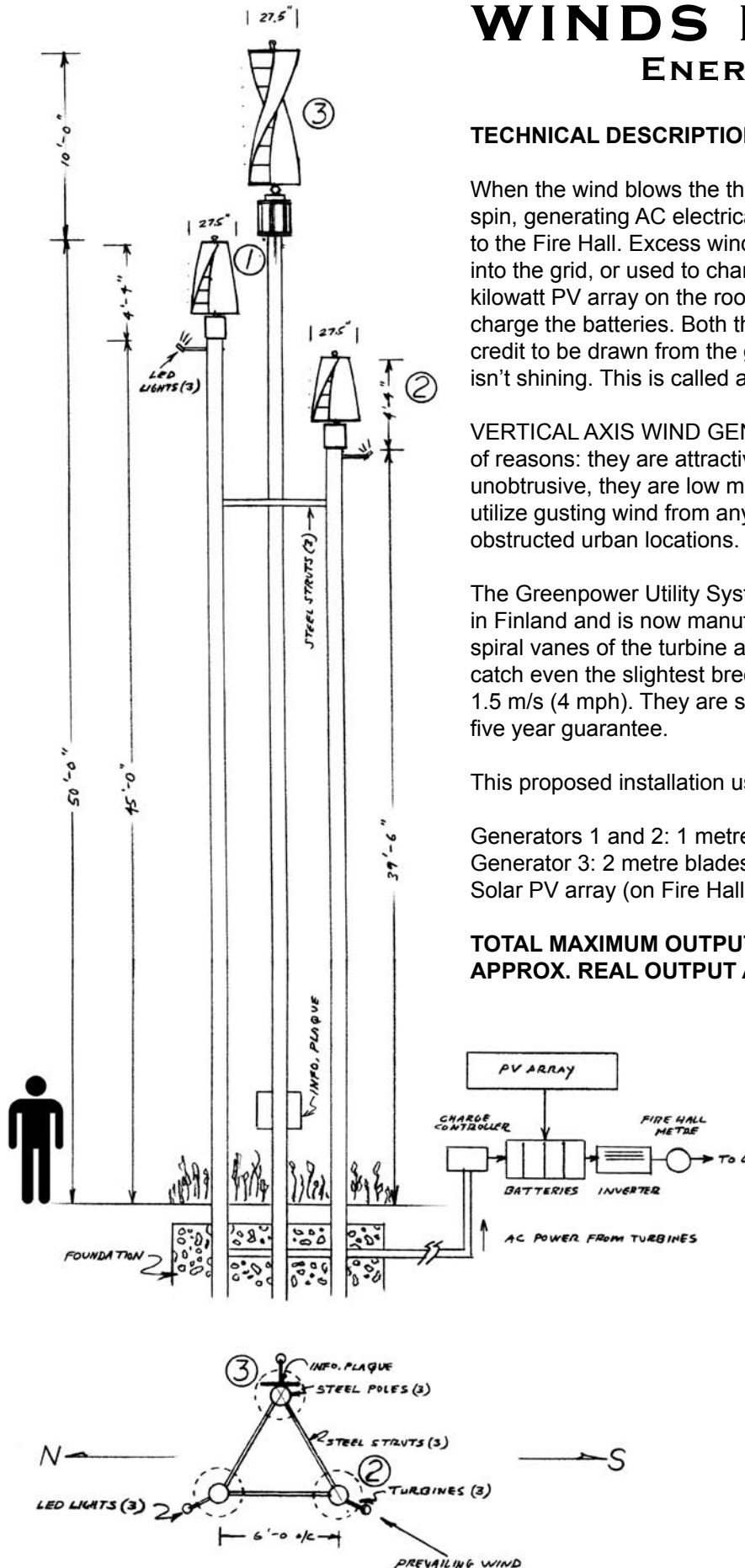
- Generators 1 and 2: 1 metre blades, max. output 1,000 watts each
- Generator 3: 2 metre blades, max. output 2,000 watts
- Solar PV array (on Fire Hall roof): 4,000 watts

TOTAL MAXIMUM OUTPUT: 8 kilowatts

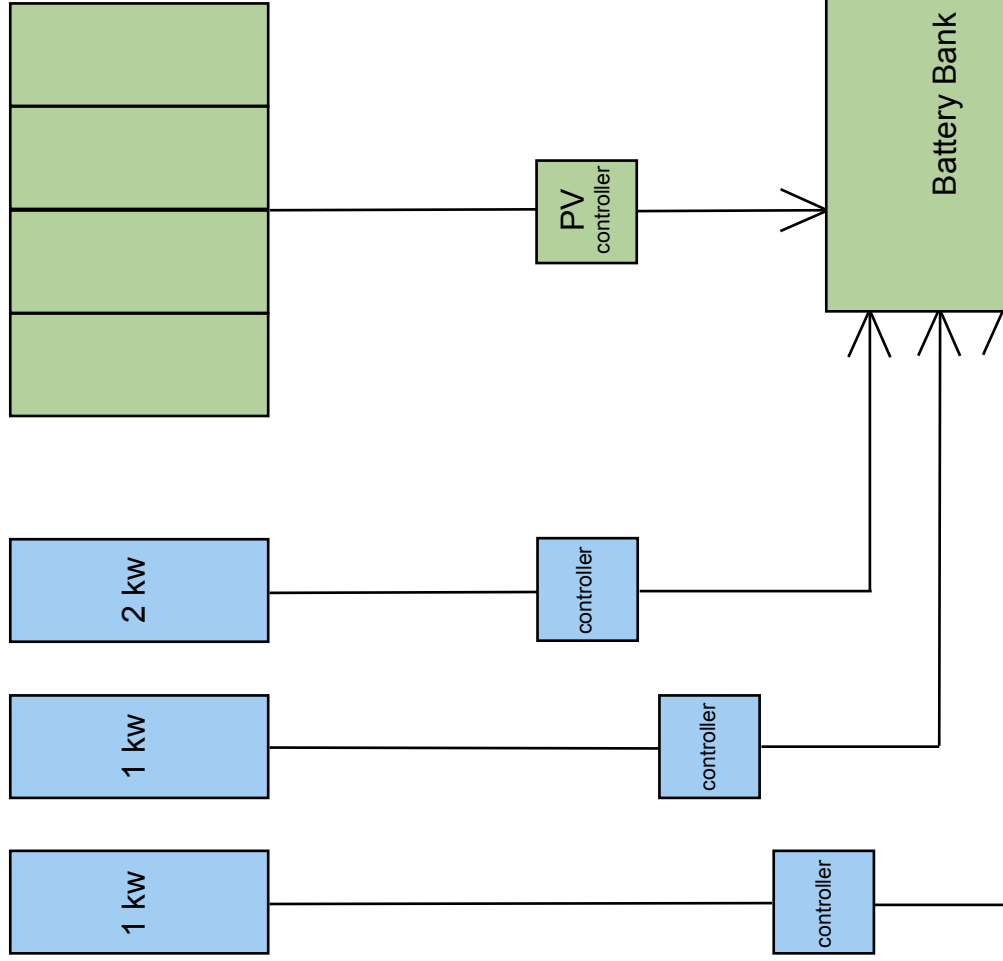
APPROX. REAL OUTPUT AVERAGED OVER ONE YEAR: 2 kilowatts

EMERGENCY BACK UP POWER:

This system will include a large battery bank that will be continuously charged by the wind and solar generators, held in readiness should it be needed. If the grid fails in an emergency, this battery bank will instantly supply power to the Fire Hall's 911 fire dispatch call centre (which serves the entire South Peace region) and other critical Fire Hall systems. It will be sized to run for 24 hours without input, but in reality the system will run much longer as it receives a charge from both the wind and solar generators.



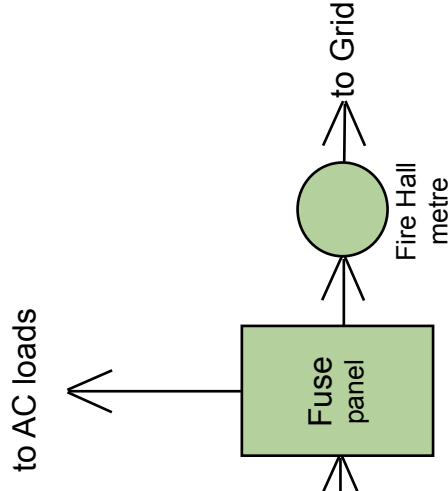
(3) Energy Sculpture
wind turbines



Each wind turbine has a dedicated controller that also supplies automatic breaking current.

Fire Hall emergency draw = 2.7 kw
Battery bank should provide this for 24 hours without input.

4 kw wind +
4 kw solar =
8 kw total



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This combination wind / solar power system is intended to grid feed to reduce the Dawson Creek Fire Hall's electrical bill and provide emergency back up power to critical systems during a grid failure, especially their 911 fire dispatch call centre. In the event of a grid failure, the back up system will switch instantly and automatically to battery/inverter power so 911 service is not interrupted. The city's new plug-in hybrid will also be charged by this system, making it a true wind and solar powered hybrid electric vehicle.